

## **REMARKS**

The present response is intended to be fully responsive to the rejection raised in the Office Action, and is believed to place the application in condition for allowance. Further, the Applicants do not acquiesce to any portion of the Office Action not particularly addressed. Favorable reconsideration and allowance of the application is respectfully requested.

In the Office Action, the Office noted that claims 2-19 are pending, claims 2-6, 18 and 19 are allowed. The Office rejected claims 7, 9-11, 14 and 15, and objected to claims 8, 12, 13 and 17.

In view of the foregoing amendments and the following discussion, the Applicants submit that none of the claims now pending in the application are anticipated under the provisions of 35 U.S.C. §102 or obvious under the provisions of 35 U.S.C. §103. Thus, Applicants believe that all of these claims are now in condition for allowance.

### **I. ALLOWED CLAIMS**

The Applicants thank the Office for indicating 2-6, 18 and 19 are allowed.

### **II. OBJECTIONS**

The Office objected to dependent claims 8, 12, 13, 16 and 17 as being dependent upon a rejected base claim, but allowable if rewritten in independent form and including all of the elements of their independent claims and their intervening claims, if any. The Applicants thank the Office for indicating allowable subject matter, but nonetheless submit that independent claims 7 and 15 are allowable over the prior art of record for the reasons set forth below,. Thus, the Applicants submit that the dependent claims 8, 12, 13, 16 and 17 are allowable, and in turn, request that the objection to such claims be withdrawn.

### **III. REJECTIONS**

#### **Response to 35 U.S.C. §103(a) Rejection of Claims 7, 9-11, 14 and 15**

The Office rejected claims 7, 9-11, 14 and 15 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,808,582 granted to Woo ("*Woo*") in view of U.S. Patent No. 6,934,317 granted to Dent ("*Dent*"), in further view of U.S. Patent

No. 6,433,726 granted to Fan ("*Fan*") and in yet further view of U.S. Patent Application Publication No. 2002/0116125 filed by Lin ("*Lin*"). The Applicants respectfully traverse this rejection.

More specifically, the Office contended that *Woo* in combination with *Dent*, *Fan* and *Lin* teaches all of the claimed elements of all of the claims 7, 9-11, 14 and 15. Contrary to the Office's contentions and in contrast to the combination of *Woo*, *Dent*, *Fan* and *Lin*, the Applicants' invention includes a combination of elements directed to *selecting (i) a first sample spacing when performing a convolution for an entire epoch of a satellite signal, and (ii) a second sample spacing when performing the convolution for less than an entire epoch of the satellite signal, where the second sample spacing is narrower than the first sample spacing.* Specifically, the Applicants' independent claim 7, as amended, positively recites:

A receiver of global positioning system (GPS) signals, comprising:

an RF/IF converter for filtering and frequency translating a received GPS signal to form an IF signal;

an analog to digital converter for digitizing said IF signal;

a tuner for removing Doppler shift from said digitized signal and producing an in-phase (I) and a quadrature (Q) signal;

a decimation circuit for subsampling said I and Q signals, said subsampled I and Q signals having either a first sample spacing or a second sample spacing, said second sample spacing being narrower than said first sample spacing;

a mode selection processor for selecting (i) said first sample spacing when performing a convolution for an entire epoch of said satellite signal, and (ii) said second sample spacing when performing said convolution for less than an entire epoch of said satellite signal; and

a processor for performing at least a subset of a convolution between a C/A reference code and said subsampled I and Q signals.

Independent claim 15, as amended, includes similar elements.

Accordingly, the satellite signal receiver of the Applicants' invention can compute signal correlations as multiple resolutions (see, e.g., the title and Summary of the present application). This way, the satellite signal receiver of the Applicants' invention can change sample spacing to accommodate for the multiple resolutions so as to, for example, (i) use a high resolution for a region of interest (e.g., "zoom in" on a peak) of said satellite signal, and (ii) use a low resolution for a full epoch of the satellite signal while being able to achieve acceptable clocking rates for modern integrated circuit logic, utilize acceptable memory sizes for storing samples, and

realize an acceptable level of complexity and cost-basis for a processor for performing the convolution. See *the present application*, at pages 23-26.

With respect to rejection of independent claims 7 and 15, the Office contended that *Woo* at Figure 12 and its abstract teaches a satellite signal receiver that includes:

- "1) a front end (1202) for receiving a satellite signal
- 2) a sampling circuit (1203) for digitizing the satellite signal
- 3) a processor (1204) for performing at least a subset of a convolution between a pseudorandom reference code and the digitized signal."

The Office, however, admitted that *Woo* "fails to teach the sampling circuit (1203) to have 'either a first sampling spacing or a second sampling spacing" and "a mode selection processor for selecting either said first sampling spacing or said second sampling spacing." Instead, the Office relied on *Dent*, *Fan* and *Lin* to teach these elements.

To this end, the Office contended that *Dent* at col. 27, lines 23-24 "teaches that the sampling rate for a received CDMA signal may be one or more samples per chip, [and ...] which rate to use would be dependent on a design criteria." In addition, the Office contended that *Fan* "teaches a decimator, i.e., 'a subsampling circuit,' coupled to an A/D converter as a means for providing a selected one of different sampling rates." From this, the Office then concluded "it would have been obvious to one skilled in the art at the time the invention was made to add a decimator, i.e., 'a subsampling circuit,' to the A/D converter of *Woo* for the purpose of providing a multiple sampling rate capability as taught by *Dent* in order to select a desired sampling rate/space, and a Doppler shift remover in order to track the correct carrier frequency as taught by *Lin*."

The Applicants note that the entire cited section of *Dent* states "the sampling rate may be one or more samples per [CDMA signal] chip." The Applicants also note that *Fan* merely states that "a variety of techniques may be used to selectively choose integer decimation factors that provide an average decimation ratio that corresponds to the desired output sample rate. The selection need not be limited to  $N$  and  $N+1$ , but could be combinations, for example, of  $N-1$ ,  $N$ ,  $N+1$ ,  $N+2$ , or any other combinations." See *Fan*, at col. 5, lines 30-35. The Applicants further note that the Office only relied on *Lin* with respect to teaching "a Doppler shift remover [ ] to track the correct carrier frequency," and not teach the combination of elements

directed to *selecting (i) a first sample spacing when performing a convolution for an entire epoch of a satellite signal, and (ii) a second sample spacing when performing the convolution for less than an entire epoch of the satellite signal, where the second sample spacing is narrower than the first sample spacing.*

As can be readily discerned from the above-listed quotes (and the rest) of *Den*, *Fan* and *Lin*, disclose none of these references, whatsoever, the claimed elements directed to *selecting (i) a first sample spacing when performing a convolution for an entire epoch of a satellite signal, and (ii) a second sample spacing when performing the convolution for less than an entire epoch of the satellite signal, where the second sample spacing is narrower than the first sample spacing.* In addition, the Applicants note that the Office has admitted that *Woo* does not disclose more than one sample spacing, and thus, cannot disclose such claimed elements.

Since the combination of *Woo*, *Dent*, *Fan* and *Lin* does not teach all of the claimed element of the amended independent claims 7-15, the Applicant submits that the combination of claimed elements of each of the amended independent claims 7 and 15 is not obvious under 35 U.S.C. §103(a) over *Woo* in view of *Dent*, *Fan* and *Lin*. As such, the Applicant submits that each of the amended independent claims, 7 and 15 are patentable over *Woo* in view of *Dent*, *Fan* and *Lin*.

Claims 9-11 and 14 depend from the independent claim 7. Since the Applicant submits that amended independent claim 7 is not obvious under 35 U.S.C. §103(a) over *Woo*, *Dent*, *Fan* and *Lin* for the reasons set forth above, the Applicant further submits that each of the dependent claims 9-11 and 14 likewise is not obvious under 35 U.S.C. §103(a) over *Woo* in view of *Dent*, *Fan* and *Lin*. Thus, the Applicants submit that each of the claims 7, 9-11, 14 and 15 fully satisfy the requirements of 35 U.S.C. §103, and therefore, are allowable.

## **CONCLUSION**

In view of the foregoing, the Applicants submit that none of the claims presently in the application are anticipated under the provisions of 35 U.S.C. § 102 or obvious under the provisions of 35 U.S.C. §103. Consequently, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Office believes that any unresolved issues still exist or if, in the opinion of the Office, a telephone conference would expedite passing the present application to issue, the Office is invited to call the undersigned attorney directly at 732-978-4899 or the office of the undersigned attorney at 732-978-7100 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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